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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/945,454	08/31/2001	Steven Verhaverbeke	004936	3536
32588	7590	10/19/2004	USA/ETCH/METAL	
EXAMINER				
MOORE, KARLA A				
ART UNIT			PAPER NUMBER	
1763				

DATE MAILED: 10/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/945,454	VERHAVERBEKE ET AL.	
	Examiner	Art Unit	
	Karla Moore	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11,14-16,18,20-25,44,45,48,49 and 51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11,14-16,18,20-25,44,45,48,49 and 51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 11, 14-16, 18, 21, 23, 25, 44-45, 48-49 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,769,952 to Komino in view of U.S. Patent Publication No. 2001/0024691 A1 to Kimura et al. and U.S. Patent No. 4,669,875 to Shiba et al.

4. Komino discloses an apparatus for atmospheric and sub-atmospheric processing of a wafer in Figure 1, comprising: an atmospheric transfer chamber (20) having a first wafer handler (22) contained therein; a wet cleaning module coupled to said atmospheric transfer chamber (any of chambers 18 A-C; column 6, rows 7-15); a sub-atmospheric transfer chamber (14) having a second wafer handler (16) contained therein; a first load lock chamber (130A) coupled to said sub-atmospheric chamber and to said atmospheric chamber; and a first sub-atmospheric processing module (10A; column 5, rows 48-59) coupled to said sub-atmospheric transfer chamber wherein said sub-atmospheric module is selected from the group consisting of a CVD deposition module, a sputter module, and oxidation module, and etch module and an anneal module.

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5. However, Komino fails to teach the apparatus comprising an integrated particle monitoring module for monitoring particles on a wafer surface coupled to said atmospheric transfer chamber and a controller for controlling said wet cleaning module and said integrated particle monitoring module wherein said controller includes stored instructions for determining the operation of said wet cleaning module depending on results in said integrated particle monitoring tool.
6. Kimura et al. teach the use of a sensor for measuring thickness, detecting the presence of foreign particles or recognition of a pattern formed on a substrate coupled to a transfer chamber (Figure 25; paragraphs 49-51, 88, 312 and 323) for the purpose of utilizing records as data for controlling the treatment time of a subsequent step and as data for judging the good or poor state of each treatment step or whether after completion of substrate processing whether the substrate is good or poor.
7. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a integrated particle monitoring module in Komino in order to utilize records as data for controlling the treatment time of a subsequent step and as data to judge the good or poor state of each treatment step or whether after completion of substrate processing whether the substrate is good or poor as taught by Kimura.
8. Examiner notes that based on the motivation above, it would have been obvious to one of ordinary skill in the art that coupling a monitor/sensor to any sort of transfer chamber, regardless of the pressure maintained in the transfer chamber would have benefits.
10. Examiner notes that Komino additionally teaches that the invention is not limited to the particular processing techniques mentioned in the disclosure for either the atmospheric or sub-atmospheric processing modules (column 6, rows 23-35 and column 11, rows 26-34).
11. Komino and Kimura teach the invention substantially as claimed and as described above.
12. However, Komino and Kimura fail to teach the integrated particle monitoring module comprising a laser source for shining a laser beam incident on a wafer surface and a plurality of detectors for detecting the reflection of said laser beam from said wafer surface to indicate the presence of defects in said wafer surface.

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13. Shiba et al. disclose the use of a particle monitoring module comprising a laser source (Figure 2, 30) for shining a laser beam incident on a wafer surface and a plurality of detectors (37a and 37b) for detecting the reflection (25) of said laser beam from said wafer surface to indicate the presence of defects in said wafer surface (column 1, rows 35-40 and column 3, row 67 through column 4, row 33) for the purpose of correctly detecting foreign particles existing on the substrate surface at a high speed by use of a simple construction.

14. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a particle monitoring module comprising a laser source for shining a laser beam incident on a wafer surface and a plurality of detectors for detecting the reflection of said laser beam from said surface in Komino and Kimura in order to correctly detect foreign particles existing on a substrate surface at a high speed using a simple construction as taught by Shiba et al.

15. With respect to claims 14 and 15, said apparatus further comprises a second load lock (130B) coupled between said atmospheric transfer chamber and said sub-atmospheric chamber. Both the first and second load lock are single wafer load locks (column 7, rows 10-18).

16. With respect to claim 16, a wafer cassette (24 A and 24 B) is coupled to said atmospheric transfer chamber for providing wafers to be loaded into said atmospheric chamber.

17. With respect to claim 21, 44, 45 and 47, as noted above the monitoring apparatus may also be a CD measurement tool/sensor for recognition of a pattern formed on a substrate or a sensor for measuring thickness (paragraph 88).

18. With respect to claim 23, as noted above any number of etch modules or ashing modules (in any of chambers 10 A-C) may be coupled to said sub-atmospheric chamber (column 5, rows 48-59).

19. With respect to claim 25, as noted above, Kimura teaches control of subsequent processing based on results from the monitoring section which are recorded in a recording means/controller (paragraphs 49-51).

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20. With respect to claim 44 and 48, in the invention of Komino, a first and second single wafer thermal process module and a deposition module (in any of chambers 10 A-C) may be coupled to said sub-atmospheric transfer chamber (column 7, rows 25-28).

21. While Komino does not teach deposition of polysilicon in any of the sub-atmospheric chambers they would be capable of depositing polysilicon and this seen as an intended use similar to the limitations of claim 12.

22. Additionally with the recitation in claim 44, that provides for the controller to control said the silicon deposition chamber, the thermal process chamber and the wet cleaning chamber, as noted above, the controller can be used to control any subsequent process (see paragraph 51). In a cluster tool, which is typically designed so that numerous processing sequences can be executed, each of the chambers would necessarily be controlled by the computer, so that in a processing sequence/intended use where processing in any of these chambers takes place after a wet cleaning step—the processing may be modified as needed based on the results of an integrated particle monitor as taught in Kimura.

23. With respect to claim 49, as noted above, first and second load locks are coupled between the sub-atmospheric transfer chamber and atmospheric transfer chamber.

24. With respect to claim 51, as noted above Kimura teaches control of subsequent processing based on results from the monitoring section which are recorded in a recording means/controller (paragraphs 49-51).

25. Claims 20, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino, Kimura and Shiba et al. as applied to claims 11, 14-16, 18, 21, 23, 25, 44-45, 48-49 and 51 above, and further in view Japanese Patent Publication No. 06-177093 A to Matsuo et al.

26. Komino, Kimura and Shiba et al. disclose the invention substantially as claimed and as described above.

27. However, Komino, Kimura and Shiba et al. fail to teach an ashing module coupled to said atmospheric transfer chamber, instead the ashing/etching chamber is coupled to the sub-atmospheric chamber so the process can take place at sub-atmospheric pressures.

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28. Matsuo teach et al. teach the use of an ashing apparatus that is used at atmospheric pressure for the purpose of improved throughput, reduced cost, etching homogeneity and higher reliability (abstract, JPO and DERWENT).

29. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have carried out an ashing process at atmospheric pressure and to have thus coupled an ashing chamber to the atmospheric transfer chamber in Komino, Kimura and Shiba et al. in order to achieve increased throughput, reduced cost, etching homogeneity and higher reliability as taught by Matsuo.

Response to Arguments

30. Claim objections of claims 11 and 14-16 are withdrawn.

31. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Applicant argues that Komino fails to describe or suggest an integrated particle monitoring module and a controller as claimed. Komino is not relied upon for these teachings, Kimura is. Motivation for the combination is found in Kimura as noted in the above rejections and the previous office action. See Figure 25 and paragraphs 49-51, 88, 312 and 323 of Kimura. Examiner notes Applicant's "strong disagreement" that Kimura teaches an integrated particle monitor and, again, directs Applicant to the above mentioned subject matter of Kimura, where Kimura does in fact teach an integrated particle monitoring module. Also, in particular, Examiner directs Applicant's attention to paragraph 51, where Kimura teaches using recorded data to control subsequent processing steps. With respect to Applicants argument that Kimura does not teach the newly added limitations (i.e., a laser source and a plurality of detectors for detecting a reflection) presented in the most recent amendment, Examiner concedes. However, Shiba et al. has been cited and relied upon to make-up for the deficiencies.

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Conclusion

32. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 571.272.1440. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 571.272.1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



km
7 October 2004



Parviz Hassanzadeh
Primary Examiner

